

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 1,4-6,8-10,53 are rejected under 35 U.S.C. 103(a) as being obvious over Hijikata Toshiki et al; (Toshiki) JP 223741; in view of Huang et al; (Huang) US 6,693,352.

Regarding claim 1, Toshiki shows in fig.1, a device having a light device having a GAn- based layer (1)(Para 0015); a high concentration GaN-based layer (3)(Para 0015) formed on the high concentration GaN-based layer (3); a first metal-Ga (4)(Para 0015) compound layer formed on the high concentration GaN-based layer (3); a first metal layer (5) formed on the first metal Ga-N compound layer (4); a third metal-Al (6) compound layer formed on the first metal layer (5);

Toshiki differs from the claimed invention because he does not explicitly disclose a semiconductor device having a conductive oxidation preventive layer formed on the third metal-Al compound layer.

Huang shows in fig.3, a semiconductor device having a conductive oxidation preventive layer (36a) formed on the third metal-Al compound layer (35).

Huang is evidence that ordinary workers skilled in the art would find reasons, suggestions or motivations to modify the device of Toshiki. Therefore, at the time the invention was made; it would have been obvious to have a device a semiconductor device having a conductive oxidation preventive layer formed on the third metal-Al compound layer in the device of Toshiki because it will transmit the light more efficiently (col.2,line 30-45).

Regarding to claim 4, Toshiki in view of Huang shows in fig.3, that the GaN-based layer is P-type or N-type (Huang reference).

Regarding to claim 6, Toshiki in view of Huang shows in fig.3 a device wherein the first metal layer is of a metal or compound having a high reactivity with Ga and N.

Regarding to claim 9, Toshiki in view of Huang shows in fig.3 a device wherein the third metal or a compound not having reactivity with the material forming the conductive oxidation preventive layer.

Regarding claim 53, Toshiki in view of Huang shows in fig.3 an NP-type light emitting device.

5. Claims 5, 10, are rejected under 35 U.S.C. 103(a) as being obvious over Hijikata Toshiki et al; (Toshiki) JP 223741; in view of Huang et al; (Huang) US 6,693,352 and further in view of Kim et al., (KR 226831 B)

Regarding claims 5, 10, Toshiki in view of Huang shows in fig.3 a device having a metal layer and having a conductive oxide.

Toshiki differs from the claimed invention because he does not explicitly disclose a semiconductor device having a metal layer that is of one selected from the group consisting of Cr and wherein the conductive oxidation preventive layer is of Au.

Kim shows in fig.1d a metal layer 8 that is of one selected from the group consisting of Cr; an LED wherein the conductive oxidation preventive layer (7) is of Au.

Kim is evidence that ordinary workers skilled in the art would find reasons, suggestions or motivations to modify the device of Toshiki. Therefore, at the time the invention was made; it would have been obvious to have a semiconductor device

having a metal layer that is of one selected from the group consisting of Cr and wherein the conductive oxidation preventive layer is of Au in the device of Toshiki because it will improve the conductivity of the device (abstract).

As for the statement "a high reactivity" it is considered a functional language. Labels, statements of intended use, or functional language do not structurally distinguish claims over prior art. The layers are formed of the same material; therefore they will have the same properties.

6. Claim 7 is rejected under 35 U.S.C. 103(a) as being obvious over Hijikata Toshiki et al; (Toshiki) JP 223741; in view of Huang et al; (Huang) US 6,693,352 and further in view of Uemura et al., (2003/0107053).

Regarding to claim 7, Toshiki, disclose a device having a metal.

Toshiki modified by Huang differs from the claimed invention because he does not explicitly disclose a semiconductor device having third metal selected from the group consisting of Ni, Pt and Pd.

Uemura discloses (Para 0106) an LED having an electrode wherein the metal is of one selected from the group consisting of Ni, Pt and Pd.

Uemura is evidence that ordinary workers skilled in the art would find reasons, suggestions or motivations to modify the device of Toshiki and Huang. Therefore at the time the invention was made, it would have been obvious to one having ordinary skill in the art to replace the material of Uemura (Pt or Pd) electrode with Kim's electrode, since it has been held to be within the general skill of a worker in the art to select a known

material on the basis of its suitability for the intended use as a matter of obvious design choice. MPEP 2144.07; and also because it will provide a device with high luminous efficiency (Para 0013).

7. Claim 8 is rejected under 35 U.S.C. 103(a) as being obvious over Hijikata Toshiki et al; (Toshiki) JP 223741; in view of Huang et al; (Huang) US 6,693,352 and further in view of Nakao et al., (USPAT 5,670,800).

Regarding to claim 8, Toshiki in view of Huang discloses a device having a third metal layer.

Toshiki differ from the claimed invention because they do not explicitly disclose a semiconductor device a metal or compound having a high reactivity with Al.

Nakao shows in fig.2, a device having a metal or compound made of NiInAl, the same material used in the invention; therefore it has a high reactivity with Al (col.7, line 20-25).

Nakao is evidence that ordinary workers skilled in the art would find reasons, suggestions or motivations to modify the device of Toshiki and Huang. Therefore, at the time the invention was made; it would have been obvious to have a semiconductor device a metal or compound having a high reactivity with Al because it will provide a device with good crystallization and good surface flatness, therefore improving the device (col.7,line 34-30).

8. Claim 54 is rejected under 35 U.S.C. 103(a) as being obvious over Hijikata Toshiki et al; (Toshiki) JP 223741; in view of Huang et al; (Huang) US 6,693,352

and further in view of Nakao et al., (USPAT 5,670,800) and Williams et al; (Williams) USPAT 5,045,408.

Regarding to claim 54, Toshiki in view of Huang and Nakao discloses a device having a first and a third metal layer.

Toshiki modified by Huang and Nakao differ from the claimed invention because they do not explicitly disclose a semiconductor device having the first metal layer that is of one selected from the group consisting of Cr, V and W and the third metal is of one selected from the group consisting of Ni, Pt and Pd.

Nakao shows in fig.2, a device having a metal or compound made of NiInAl, (col.7, line 20-25).

Nakao is evidence that ordinary workers skilled in the art would find reasons, suggestions or motivations to modify the device of Toshiki in view of Huang. Therefore, at the time the invention was made; it would have been obvious to have a semiconductor device a metal or compound made of NiInAl because it will provide a device with good crystallization and good surface flatness, therefore improving the device (col.7, line 34-30).

William discloses a device having a CrGa intermettalic compound (claim 2).

William is evidence that ordinary workers skilled in the art would find reasons, suggestions or motivations to modify the device of Toshiki in view of Huang. Therefore, at the time the invention was made; it would have been obvious to have a semiconductor device a CrGa intermettalic compound metal because it will provide a device that is thermodynamically stabilize (col.4, line 35-40).

Allowable Subject Matter

9. Claims 55-57 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The prior art of record does not disclose or suggest either in singularly or in combination the following limitations and other elements in the claims:

References Hijikata Toshiki et al; (Toshiki) JP 223741; in view of Kim et al., (KR 226831 B); in view of Motoki; (Motoki) US 2002/0063258 does not disclose:

- A device having a transparent electrode layer formed between the high concentration GaN-based layer and the first metal-Ga Compound layer.

Response to Arguments

10. Applicant's arguments with respect to claims 1-10, 53, 54-57 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MARC ARMAND whose telephone number is (571)272-9751. The examiner can normally be reached on 9-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on 571-272-1705. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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